

BEAUFORT HARBOR, N. C.

L E T T E R

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF BEAUFORT HARBOR, N. C., WITH A VIEW TO PROVIDING A SUITABLE TURNING BASIN AND ANCHORAGE AREA IN FRONT OF THE TOWN OF BEAUFORT.

JULY 2, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

WAR DEPARTMENT,
Washington, July 1, 1914.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated June 30 ultimo, together with copies of reports from Maj. H. W. Stickle, Corps of Engineers, dated April 25, 1913, and February 16, 1914, with map, upon a preliminary examination and survey, respectively, of Beaufort Harbor, N. C., made by him in compliance with the provisions of the river and harbor act approved March 4, 1913.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 30, 1914.

From: The Chief of Engineers, United States Army.

To: The Secretary of War.

Subject: Preliminary examination and survey of Beaufort Harbor, N. C.

1. There are submitted herewith, for transmission to Congress, reports dated April 25, 1913, and February 16, 1914, with map, by

Maj. H. W. Stickle, Corps of Engineers, on preliminary examination and survey, respectively, of Beaufort Harbor, N. C., with a view to providing a suitable turning basin and anchorage area in front of the town of Beaufort, authorized by the river and harbor act approved March 4, 1913.

2. The existing projects for improvement of Beaufort Harbor provide for a channel from the north 60 feet wide and 10 feet deep at mean low water, a channel from the south 100 feet wide and 7 feet deep at mean low water, and a channel from the east 40 feet wide and 5 feet deep at mean low water. The first two channels mentioned have been completed, and an anchorage area or turning basin 200 feet wide and 2,000 feet long has been constructed in front of the town under authority contained in the river and harbor act of June 25, 1910. The improvement now desired is an enlargement of the anchorage area, which, it is claimed, is congested to such an extent as to endanger the vessels using it. The district officer presents a plan of improvement which provides for a basin 550 feet wide, 10 feet deep at mean low water, and about 2,300 feet long, protected from deterioration by a stone bulkhead, at a total estimated cost of \$53,100. He expresses the opinion that the locality is worthy of improvement to this extent, provided local authorities will construct a suitable public wharf with storage facilities and mechanical equipment and with rail connections. The division engineer is of the opinion that the further improvement of the locality with a view to providing a suitable turning basin and anchorage area in front of the town of Beaufort is not worthy of being undertaken by the General Government at the present time.

3. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated June 16, 1914. The board does not believe that the United States would be justified in carrying out the expensive project proposed by the district officer, but it is of opinion that it is advisable to provide a moderate enlargement of the existing basin to a depth of 10 feet, covering the triangular area shown on the accompanying map, at an estimated cost of \$15,900.

4. After due consideration of the above-mentioned reports, I concur with the views of the Board of Engineers for Rivers and Harbors, and therefore report that the improvement by the United States of Beaufort Harbor, N. C., with a view to providing a suitable turning basin and anchorage area in front of the town of Beaufort, is deemed advisable to the extent of excavating to a depth of 10 feet at mean low water the triangular area shown in solid lines on the accompanying map, at an estimated cost of \$15,900 for first construction and \$1,100 annually for maintenance. The full amount of the estimate should be provided in one appropriation.

DAN C. KINGMAN,
Chief of Engineers, United States Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS
ON SURVEY.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
June 16, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. Beaufort Harbor has been improved to the extent of providing a channel from the north 60 feet wide and 10 feet deep at mean low water, connected with the Norfolk-Beaufort inland waterway, and one from the south 100 feet wide and 7 feet deep at mean low water, and an anchorage or turning basin 200 feet wide and about 2,000 feet long in front of the town.

2. The commerce of the locality has been increasing, and for 1912 amounted to approximately 90,000 tons, having a value of \$2,800,000. A list of 25 vessels, ranging in length from 42 feet to 104 feet and in depth from 3.6 feet to 6.7 feet, which are engaged in business at this port and make use of the anchorage basin is given herein. These vessels carry on an important fishing business. The improvement desired is an enlargement of the anchorage basin, which it is claimed is congested to such an extent as to endanger the vessels.

3. A survey having been authorized, the district officer presents a plan of improvement which provides for a basin 550 feet wide and about 2,300 feet in length and 10 feet deep at mean low water, at an estimated cost of \$35,300 and \$2,000 annually for maintenance; and in connection therewith a stone bulkhead, at an estimated cost of \$17,800, to protect the basin from deterioration by the movement of sand across the shoals at high tide.

4. The district officer is of opinion that the locality is worthy of improvement to the extent outlined above, at a total estimated cost of \$53,100, provided a suitable public wharf, with storage facilities and mechanical equipment with rail connections, be provided by local authorities. The division engineer is of opinion that further improvement is not worthy of being undertaken by the General Government at the present time.

5. The board was not convinced of the advisability of the extensive improvement proposed at the expense of the General Government, and interested parties were so informed and given an opportunity of presenting their views. This resulted in a hearing before the board on April 21, 1914, which was attended by Hon. John H. Small, M. C., Hon. John M. Faison, M. C., and a delegation of citizens from the locality.

6. It appears from a study of conditions here that the present anchorage in front of the city is at times congested, and that there is no other place available within reasonable reach. The board does not believe that the United States would be justified in carrying out the expensive project proposed by the district officer. It has secured estimates for a moderate enlargement of the existing basin to a depth of 10 feet, covering the triangular area shown on the map by solid lines, the amount being \$15,900 for first construction and \$1,100 annually for maintenance. This additional area, together with the

available anchorage, would be sufficient to prevent undue congestion and to meet the reasonable demands of commerce, and the board believes the locality worthy of additional improvement to this extent. It therefore reports that in its opinion it is advisable for the United States to undertake the additional work outlined above, at an estimated cost of \$15,900 for first construction and \$1,100 annually thereafter for maintenance. The total amount of the estimate should be made available under one appropriation.

7. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

FREDERIC V. ABBOT,
Colonel, Corps of Engineers,
Senior Member Present.

PRELIMINARY EXAMINATION OF BEAUFORT HARBOR, N. C.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., April 25, 1913.

From: District Engineer Officer.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

Subject: Preliminary examination report Beaufort Harbor, N. C.

1. This is a report upon the preliminary examination of Beaufort Harbor, N. C., with a view to providing a suitable turning basin and anchorage area in front of the town of Beaufort, provision for which was made in the river and harbor act approved March 4, 1913. The duty of making this preliminary examination was assigned to me by department letter of March 18, 1913.

2. Beaufort has a population of about 2,500. The main street runs parallel with the water front, and the town has been laid off in lots on each side of this street. The lots on the south side of the street were originally nearly all under water. In the business district, about the central portion of this street, these water lots have been reclaimed, and are now occupied by stores and warehouses, having docks at the rear for handling water-borne merchandise. About 1,350 feet south of this street, at the west end, is an island of marsh, known as "Town Marsh," and about 700 feet south of the eastern end of this street is what is known as "Bird Shoal," a high sand shoal, a small portion of which is above high water, and practically all of which is bare at low water. A narrow slough, from 4 to 6 feet in depth, separates Bird Shoal from the eastern end of Town Marsh. The two combined form an inner basin, or harbor, about one-half mile wide and one-half mile long. The marsh affords excellent protection to the western end of this basin and the shoal furnishes some protection to the eastern end at low water, but little, if any, at high water.

3. The following is a list of vessels at present using this anchorage area:

No.	Name.	Regis- try No.	Length.	Beam.	Depth.	Gross tonnage.
1	Seven Marys.....	117191	64.0	16.0	4.0	18
2	Sadie E. Culver.....	116743	69.4	19.9	5.5	32
3	Madeline.....	207396	58.6	17.3	4.8	29
4	Geo. D. Balster.....	205636	66.5	21.2	5.4	32
5	R. W. Taylor, jr.....	207854	59.4	17.3	5.1	32
6	Wallace.....	208581	66.0	19.3	5.0	37
7	Capt. Dick.....	207333	62.7	18.8	4.7	37
8	Gladys.....	86604	65.2	17.0	4.8	38
9	Leola B. Gaskill.....	201554	52.4	18.2	5.5	35
10	Cooch.....	127350	65.0	17.4	5.3	35
11	Wyna.....	81689	53.0	18.7	4.0	21
12	Conroy.....	126337	46.4	16.1	4.0	20
13	Alert.....	106503	58.0	16.5	4.2	30
14	Dewey.....	157530	60.0	16.5	4.9	27
15	Wentz L. Roberts.....	81552	63.7	19.7	5.4	33
16	Gordon.....	21449	55.5	17.6	4.5	34
17	George B. Faunce.....	85983	62.5	17.5	4.9	20
18	Pilgrim (new).....	150680	104.3	23.0	6.7	98
19	Marks (new).....		90.0			
20	Admiral.....	107509	81.0	19.2	4.6	29
21	Clifford Perrin.....	127471	42.8	14.6	3.6	19
22	Maybelle.....	92484	78.0	20.3	5.5	92
23	Maggie E. Davis.....	92999	51.0	16.3	3.9	16
24	E. M. Willis.....	208725	61.0	20.0	6.0	44
25	Velma Brooks.....	161869	76.5	19.8	5.3	33

4. The first 17 vessels are engaged in the menhaden industry, and are all manned by crews living in Beaufort. It is their custom to leave the harbor early in the morning, during the fishing season, going out to sea for their catch, and returning to this anchorage at night. Nos. 18 and 19 are new vessels engaged for this year's fishing. Nos. 20 to 25 are freight boats engaged in traffic between Beaufort and Newbern, Norfolk, and Baltimore. In addition to these vessels there are, for about 6 months of the year, from October to April, some 8 or 10 boats engaged in the oyster trade, bringing their cargoes to the oyster factory at Beaufort. Some of these boats are as large, and others only slightly smaller, than those given in the above table. Also, during the months of November and December, and again in March and April, there are from two to six yachts anchored in the harbor every day. About one hundred and forty yachts per year in all anchor for an average period of three days each.

5. The boats engaged in the menhaden industry caught, last year, approximately 37,000,000 fish, valued approximately at \$55,500. The factories converted this catch into approximately 3,000 tons of fish-scrap fertilizer, valued at \$90,000, and 3,700 barrels of fish oil, valued at \$46,250. The product of the fish factories are practically all handled by water, by the freight boats given in the above list. The oyster boats above mentioned bring about 90 per cent of the 150,000 bushels handled by the local factory, the quantity thus brought being valued at \$33,750. The commerce for the year 1912 exceeds that for 1911 by 20 per cent in the item of fish fertilizer; by 24 per cent in the item of fish, fresh; and by 50 per cent in the item of oysters.

6. There are three channels at present under improvement leading to this basin:

First. That from the north, Gallants Channel, 60 feet wide and 10 feet deep, at mean low water.

Second. That from the south, the Bulkhead Channel, 100 feet wide and 7 feet deep at mean low water.

Third. That from the east, the channel from Core Sound to Newport River, 40 feet wide and 5 feet deep at mean low water.

A provision of the river and harbor act of June 25, 1910, authorized the use of any unexpended balance of the moneys then appropriated for constructing a turning basin in front of the town of Beaufort. In compliance with this provision a channel was dredged 200 feet wide from the western extremity of the basin for a distance of 2,000 feet, and this area is at present used as an anchorage area for the vessels in this harbor, greatly restricting the width of the channelway. The improvement of the first two channels is now one of maintenance. Actual work of improvement of the third channel is not yet undertaken. This improvement is contingent upon previous contributions by local interests of \$10,000 to be applied to the work of improvement. The act making appropriations for this last channel provides "That any part of said appropriation and local contribution unexpended in completing the improvement of said channel may be used in improving and enlarging the turning basin in front of the town of Beaufort." I have no information which leads me to believe there will be any unexpended balance for this purpose.

7. The locality and conditions are shown on map, which is herewith prepared in connection with this examination.

8. Previous examinations made concerning the harbor at Beaufort are:

House or Senate.	Congressional documents.			Annual Report of Chief of Engineers.	
	No.	Congress.	Session.	Year.	Page.
House.....	78	46	Third...	1881	1013-1017
				1882	1094
				1885	1076-1082
				1887	1033
				1891	1368-1369
Do.....	246	52	Second..	1893	1457-1461
Do.....	1454	60	do.....		
Do.....	511	61	do.....		

9. *Commerce.*—For the calendar years 1911 and 1912 the commerce pertaining to the harbor at Beaufort follows:

Vessel classification.

Classes.	1911			1912		
	Number.	Net registered tonnage.	Passengers.	Number.	Net registered tonnage.	Passengers.
American registered:						
Sailing.....	228	4,332	.....	175	1,925	.....
Gasoline.....	212	1,920	7,000	240	2,880	.....
Barges.....				6	1,200	7,000
Total.....	440	6,252	7,000	421	6,005	7,000

From 150 to 200 steamers and yachts pass through and come in for harbor during the year.

Freight traffic.

Articles.	Amount in customary units.		Amount in short tons.		Valuation.		Gain, 1912.
	1911	1912	1911	1912	1911	1912	
Brick.....	138,000.....	155,000.....	345	387	\$1,035.00	\$1,161.00	\$126.00
Cattle.....	152 head.....	310 head.....	38	78	3,800.00	7,800.00	4,000.00
Coal.....	1,968 tons.....	2,510 tons.....	1,968	2,510	7,872.00	10,040.00	2,168.00
Cotton.....	2,196 bales.....	3,555 bales.....	549	889	137,250.00	213,360.00	76,110.00
Cotton seed.....	935 tons.....	1,940 tons.....	935	1,940	18,700.00	54,320.00	35,620.00
Cottonseed meal.....	200 tons.....	243 tons.....	200	243	6,000.00	7,290.00	1,290.00
Cottonseed hulls.....	.....	267 tons.....	.....	267	.....	2,136.00	2,136.00
Clams.....	14,960 bushels.....	9,449 bushels.....	748	472	14,960.00	9,440.00	5,520.00
Crossties.....	.....	2,000.....	.....	125	.....	800.00	800.00
Crabs, soft.....	1,500 dozen.....	53,687 dozen.....	30	107	15,000.00	53,500.00	38,500.00
Cement.....	.....	160 tons.....	.....	160	.....	1,360.00	1,360.00
Eggs.....	240 crates.....	425 crates.....	6	11	2,400.00	4,400.00	2,400.00
Fertilizer.....	1,970 tons.....	3,833 tons.....	1,970	3,833	59,100.00	114,990.00	55,890.00
Fish oil.....	.....	2,200 barrels.....	.....	550	.....	29,700.00	29,700.00
Fish, fresh.....	48,900 boxes.....	64,607 boxes.....	4,890	6,461	489,000.00	646,100.00	157,100.00
Fish, salt.....	14,660 barrels.....	9,038 barrels.....	733	452	7,330.00	45,200.00	37,870.00
Fish, fertilizer.....	55,000,000.....	67,301,000.....	27,500	33,650	61,875.00	100,950.00	39,075.00
General merchandise.	8,354 tons.....	7,731 tons.....	8,354	7,731	1,253,100.00	1,159,650.00	93,450.00
Grain.....	25,280 bushels.....	23,400 bushels.....	632	585	22,120.00	12,870.00	9,250.00
Gasoline.....	.....	5,459 barrels.....	.....	955	.....	44,885.00	44,885.00
Hay.....	175 tons.....	275 tons.....	175	275	4,900.00	5,500.00	600.00
Hogs.....	200 head.....	275 head.....	10	14	2,000.00	2,800.00	800.00
Horses.....	84 head.....	110 head.....	42	55	8,400.00	11,000.00	2,600.00
Ice.....	800 tons.....	275 tons.....	800	275	5,600.00	1,925.00	3,675.00
Kerosene.....	.....	2,621 barrels.....	.....	478	.....	13,145.00	13,145.00
Lumber.....	7,970,000 feet.....	8,135,000 feet.....	15,958	16,270	159,580.00	162,700.00	3,120.00
Lime.....	.....	1,937 barrels.....	.....	242	.....	1,694.00	1,694.00
Machinery.....	123 tons.....	258 tons.....	123	258	12,300.00	25,800.00	13,500.00
Oysters.....	110,778 bushels.....	163,671 bushels.....	4,431	6,547	27,693.75	40,918.75	13,225.00
Potatoes.....	20,633 bushels.....	35,780 bushels.....	619	1,073	21,665.00	32,565.00	10,900.00
Poultry.....	8,000 head.....	9,050 head.....	16	18	3,200.00	3,600.00	400.00
Peanuts.....	.....	1,075 bushels.....	.....	15	.....	1,200.00	1,200.00
Rosin.....	2,750 barrels.....	3,225 barrels.....	440	516	13,200.00	19,608.00	6,408.00
Scallop.....	.....	3,500 gallons.....	.....	18	.....	3,500.00	3,500.00
Shingles.....	122,000.....	87,000.....	61	43	488.00	430.00	58.00
Salt.....	.....	4,625 sacks.....	.....	323	.....	3,230.00	3,230.00
Turpentine spirits.....	1,298 barrels.....	525 barrels.....	292	118	52,560.00	11,446.00	41,114.00
Tar.....	.....	10 barrels.....	.....	2	.....	30.00	30.00
Timber.....	.....	75,000 feet.....	.....	225	.....	675.00	675.00
Vegetables.....	1,000 packages.....	675 packages.....	20	34	500.00	850.00	350.00
Watermelons.....	80,000.....	88,300.....	800	883	12,000.00	13,240.00	1,240.00
Wood.....	1,400 cords.....	1,226 cords.....	1,400	1,226	5,600.00	4,904.00	696.00
Total.....	.....	.....	74,085	90,314	2,429,228.75	2,880,712.75	451,724.00

Last year cement, fish oil, gasoline, kerosene, lime, and salt were included in "General merchandise."

10. Beaufort is the present eastern terminus of the Goldsboro-Beaufort branch of the Norfolk & Southern Railway. The railroad crosses between Morehead City, the inland waterway from Pamlico Sound to Beaufort Inlet, some unnavigable channels, and Gallants Channel, on a high trestle bridge. The clear opening in the draw span across Gallants Channel, with which only this report is concerned, is only 30 feet. It is probable that this draw span must be increased, and measures to that end have been instituted by the War Department.

11. A hearing was held at Beaufort in connection with the preliminary examination on April 17, 1913. It was attended by about 40 parties locally interested. Record¹ of hearing is herewith. Three photographs¹ showing condition in April, 1913, furnished by Mr. A. F. Doane, jr., are also submitted.

¹ Not printed.

12. The masters of vessels of the class of boats listed in paragraph 3 agree that about 30 yards is the minimum distance apart for their boats to lie with safety, and that 15 to 25 fathoms of chain should be paid out to these vessels to the anchors. Taking the 25 vessels shown in the above list, having an average beam of 18 feet, and allowing 30 yards apart, would require an anchorage area of 2,700 feet long, which would extend from the Bulkhead Channel to the high portion of Bird Shoal. Allowing 20 fathoms of chain for these vessels, averaging, as they do, about 65 feet in length, would require an area 370 feet wide to provide turning room. In addition to this width an unobstructed channel way, 100 feet wide, should be provided for passing vessels, this making the minimum width of anchorage area to accommodate the present fleet 470 feet.

There is a growing tendency to use larger vessels, as shown by the dimensions of Nos. 18 and 19 in the above list, so if improvement is undertaken it would probably be advisable to provide for vessels as large as No. 18, which would require an additional 80 feet, bringing the total width of the anchorage area up to 550 feet. This would require the excavation of an additional 350 feet in width for the full length of the basin, or 2,700 feet.

13. As the depth of the first entrance channel, given in paragraph 6 above, is 10 feet at mean low water, and that of the second is sufficient to allow a vessel drawing 10 feet to enter it at high water, it would appear to be advisable to have a portion of this area dredged to that depth, though most of the vessels now using this harbor would be accommodated in a basin having a depth of 7 feet at mean low water, provided the eastern end of the basin were protected as stated below. Since the project depth for the Norfolk-Beaufort inland waterway is now 12 feet, consideration of this depth for a portion of any turning basin and anchorage basin determined upon should be had.

14. The eastern end of the proposed basin would extend beyond the end of Town Marsh, and would be only partially protected from the sea by Bird Shoal. The deterioration of this end of the basin would be very rapid, due to the seas at high tide washing sand from Bird Shoal into it. In six years the area of Bird Shoal above high water has decreased 66 $\frac{2}{3}$ per cent, and some measure would have to be taken to prevent the advance of this shoal into the anchorage basin. It is believed that a levee should be constructed to an elevation of about 1 foot above high water, extending from the eastern end of Town Marsh, for about 1,400 feet, to that portion of Bird Shoal still above high water, which would then protect the remainder of the anchorage area. Material excavated from the basin could be deposited on the outside of this levee and grass planted thereon so as to extend Town Marsh for the entire distance.

15. Existing wharves pertaining to the harbor number 45, of which (a) 31 are along the front of the town adjacent to the proposed improvement; (b) 9 are along Gallants Channel near the Norfolk & Southern Railroad bridge; (c) 2 are at the fish factories on Gallants Point; and (d) 3 on Pivers Island. Photographs of the wharves with individual descriptions and map showing location of each accompanied my report on "Water terminal and transfer facilities: Beaufort Harbor, N. C., 2," dated January 30, 1913. They are all of timber construction, generally with wooden pile foundation and plank deck-

ing. They have a frontage varying from 3 feet to 200 feet, the total frontage being about 1,200 feet. The height of decking above water varies from 4 to 11 feet, and the available depth of water at the wharves varies from 2 to 13 feet. Twenty-three wharves are provided with warehouses of some description. Such warehouses have a total floor area of about 34,000 square feet. Two fertilizer works are equipped with modern machinery, with Hunt elevators (Nos. 41 and 42); one wharf (No. 32) pertains to marine railway of Whitehurst and Rice. This railway has two tracks, one 165 feet and the other 100 feet long. The longer one is equipped with a 10-horsepower engine for drawing boats out and the other one with a hand winch. The wharf of the Atlantic Packing Co. (No. 23) is equipped with two derricks for unloading oysters, and with cars and tracks for transferring oysters from wharf to steamer and elsewhere about the factory. A wharf of the Norfolk & Southern Railroad Co. (No. 36) is for unloading coal cars to scows underneath. Eleven wharves are equipped with derricks for handling freight. Wharf No. 20 is a city wharf, and No. 10 is partly owned by the city. The part of Wharf No. 10 is a negligible affair. The main public wharf (No. 20) consists of a slip the width of the street between curbs, with a walk of sidewalk width on each side.

The smaller wharves are used for boat landings for row and gasoline boats. Other wharves are used in connection with fish, oyster, fertilizer, cotton-ginning industries, and in connection with stores handling groceries, hardware, dry goods, gasoline, oil, and general merchandise. The warehouse, partly stores and factories, are used to store for sale or shipment all classes of general merchandise.

The wharves and warehouses are generally in fair condition. Terminal facilities at Beaufort are not adequate for the existing commerce, and a public wharf, with storage facilities and mechanical equipment and provided with rail connection to the Norfolk Southern Railroad is needed. A suitable wharf equipped as outlined should be a condition precedent to the undertaking of this project by the United States.

16. In connection with the proposed improvement there are no possibilities for the development and utilization of water power for industrial and commercial purposes.

17. There is no possibility of coordinating improvement for navigation with improvements desirable for other purposes to compensate the Government for expenditures which may be made in the interest of navigation.

18. In addition to the benefits that would accrue to local and through commerce by the construction of this anchorage area, all commercial interests would receive some benefits from the construction of the levee connecting Town Marsh and Bird Shoal by reason of the protection afforded the water front opposite from the effect of severe southeast storms. About 30 years ago, when Bird Shoal was much higher than at present, this portion of the water front suffered considerable damage by such a storm. It is also probable that the material to be excavated could be disposed of to the advantage and benefit of individual owners of adjacent marsh lands or to those owners of the so-called water lots who are desirous of reclaiming them. The amount and value of these benefits is, however, difficult to determine.

19. It is believed that the present and prospective requirements of the locality in the way of an anchorage basin would be adequately served by a basin 550 feet wide and 2,700 feet long, the western 1,000 feet to be 10 feet deep at mean low water and the remaining portion 7 feet deep at mean low water, with the eastern end further protected by a levee 1,400 feet long extending from Town Marsh to the high portion of Bird Shoal.

20. The needs of existing and prospective commerce for a basin for anchorage and for turning at Beaufort is undoubted, and are due to increasing commerce and to the increase in the number and size of boats engaged in the fishing and allied industries. The vessels, Nos. 1, 2, 4, and 6, above (par. 3) were added to the fleet in 1912; Nos. 3, 5, 7, and 15 were added in 1911. Nos. 8, 10, 11, 12, 13, and 14 were practically the only boats engaged in fishing five years ago, and they have all been rebuilt and lengthened to their present dimensions since that time. The construction of the levee proposed, as an incident of the improvement, would be of material advantage in reducing the cost of maintenance of the existing harbor and any extension thereof which may be made behind the levee. This feature of the improvement is without question one to be considered as not merely one of local importance. I have personally observed on many occasions the congested condition of the harbor, which renders it difficult for vessels to turn or even to move in the harbor. The vessels engaged in fishing are listed in paragraph 3, their lengths being those at the water lines. Above they are very much longer and, with their extended spars, exceed some 130 feet in length over all. Collisions are avoided only by the exercise of patience and great skill and with loss of time.

21. The provision of slips along the town of Beaufort for the vessels concerned by riparian owners would be an expensive proposition. Such slips would be long and project well into the channel which has been provided by the Government. The construction of wharves along the entire water front would also be expensive and interfere with the use of such wharves as now exist by the smaller launches and boats, of which there are great numbers operating with Beaufort. The only practical provision seems to be the construction of an anchorage basin, which may be more or less extensive and provide such relief as could be afforded with funds appropriated, to the extent existing and prospective commerce may be found to justify. It is not believed that the improvement should be considered simply as a terminal improvement.

22. With this view, and bearing in mind the incidental benefit to existing improvement for Beaufort Harbor by the levee construction herein outlined, I recommend a survey to determine the extent to which the improvement may be advisable by the General Government.

H. W. STICKLE,
Major, Corps of Engineers.

[First indorsement.]

OFFICE DIVISION ENGINEER, SOUTHEAST DIVISION,
May 1, 1913.

To the CHIEF OF ENGINEERS:

1. I am of the opinion that this project is not worthy of a survey. I do not believe in the policy of attempting to provide an anchorage basin sufficient to accommodate all the vessels which may go to a harbor of this kind, such a thing would be entirely impossible, not even thought of in connection with most of our harbors which do 50 or 100 times as much business as this one does. It seems to me to be foolish to attempt to excavate and maintain a basin which the district officer thinks must be more than a half mile long and 500 feet wide to accommodate 25 little vessels, having an average length of less than 65 feet each. I don't see any necessity of these vessels anchoring right in front of the town. They should go to the wharves to receive and deliver freight and, afterwards, if they want to anchor, they should go to whatever sheltered locality nature provides in the vicinity.

2. I do not recommend the expenditure of any money for a survey or preparation of any plan for a larger turning basin or an extensive anchorage ground.

DAN C. KINGMAN,
Colonel, Corps of Engineers.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
May 26, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. For reasons stated herein the board concurs with the district officer in recommending a survey in order to determine the extent and advisability of the improvement.

For the board:

WM. T. ROSSELL,
*Colonel, Corps of Engineers,
 Senior Member of the Board.*

SURVEY OF BEAUFORT HARBOR, N. C.

WAR DEPARTMENT,
 UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., February 16, 1914.

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army
 (Through the Division Engineer).

Subject: Report of survey of Beaufort Harbor, N. C.

1. In compliance with instructions contained in department letter dated June 3, 1913, the following report of the survey of Beaufort Harbor, N. C., with a view to providing a suitable turning basin and anchorage area in front of the town of Beaufort, together with plan and estimates for its improvement, is submitted.

2. Immediate charge of the survey was assigned to Assistant Engineer Harry T. Paterson, who reports as follows:

The survey was made in November, 1913, by a party under Junior Engineer Alfred von Siller, and consisted in taking soundings over that portion of the harbor lying between the town of Beaufort and the marsh and shoals opposite, as well as portions of Gallants Channel and the Bulkhead Channel immediately to the westward thereof. On hydrographic base lines stakes 100 feet apart were set and soundings were located by measurement with a graduated wire at 20-foot intervals on ranges run at right angles to the base from these stakes.

Shore lines, wharves, and topography were taken with the plane table, using horizontal control furnished by the United States Coast and Geodetic Survey. Soundings are referred to mean low water, Beaufort datum, which is the plane of reference used on the existing improvement at this harbor and on contiguous works. This plane is 1.9 feet below mean sea level, as determined by the United States Coast and Geodetic Survey and referenced by the bench mark of the United States Geological Survey at Pier No. 1, Morehead City. From the data given in the Tide Tables published by the United States Coast and Geodetic Survey it is noted that mean sea level is 1.4 feet above the plane of Tropic lower low water; therefore to make the soundings on the accompanying map conform to this plane it would be necessary to apply a correction of plus 0.5 feet. It is not believed that the plane of reference used is too low, as gages set to this datum frequently have their zeros two or three tenths out of water, due to the combined effect of wind and lunar tides.

3. There are no material changes in physical conditions in connection with the proposed improvement to report since the preliminary examination report was submitted. The commercial statistics for 1913 are not yet fully available, though from the incomplete returns in hand there is a probability of substantial increase over 1912.

4. Further study has confirmed the figures given in the preliminary report as to the size of the basin required by existing and prospective commerce. There is shown on the accompanying map (in broken line) a rectangular basin, having a width of 550 feet, approximately 2,500 feet on the long side and 2,100 feet on the short side. The long side is parallel to and 120 feet distant from the south side of Front Street in the town of Beaufort. An additional triangular shaped piece is to be removed at the southwest corner of the basin for ease of entrance, as it has been a matter of frequent occurrence for strangers entering this harbor to run their boats high up on the shoal at this point.

5. It is to be noted that the length of the proposed basin is slightly less than that suggested in my preliminary report, paragraph 12. A protest has been received, dated July 2, 1913, from Mr. Charles L. Abernethy, copy ¹ of which is herewith, against closing up the water view just west of Bird Island. I can not concur in his views as to the damage to his property that would result from the construction of the bulkhead proposed herein, and it is my opinion that the effect would be to enhance rather than to depreciate its value. If the bulkhead be constructed as proposed, and the excavated material deposited to the southward thereof, I can not imagine that it would be any more unsightly than the present view, especially at low water, when the flats are entirely bare. The closure objected to is indicated on accompanying map in extension of the proposed bulkhead between points "A" and "B." There would be good grounds for Mr. Abernethy's objections if the land made with the excavated material were used for commercial structures, such as oil houses and net reels.

Should the basin be extended eastward, it would be convenient to deposit material between the points "A" and "B" and on about that

¹Not printed.

line, and the complete closure would probably be of some advantage to maintenance. The deterioration of Beaufort Harbor is doubtless due largely to the rush of water through the channel just east of Town Marsh, and if this channel be closed, as is proposed, the deterioration would be naturally reduced. At any rate, the providing of an anchorage and turning basin sufficiently large in area to meet the needs of present and immediately prospective commerce does not require any work or construction to which Mr. Abernethy objects. In the future development of this harbor the interests of commerce may not permit the necessary work to be done in accordance with Mr. Abernethy's wishes as far as his private interests are concerned.

6. In the estimates below given allowance has been made for side slopes of 2.5:1, and for 1 foot overdepth dredging at full price:

Estimate for basin dredged to a depth of 10 feet at mean lower low water.

Material to be removed from section.....	cubic yards..	227,900
Material to be removed from 1-foot overdepth.....	do....	28,800
Total material to be removed.....		do.... 256,700
Unit price.....	cents..	12.5
Cost of dredging.....		\$32,100
Superintendence and contingencies.....		\$3,200
Total cost.....		\$35,300
Estimated annual maintenance.....		\$2,000

The material to be dredged consists of sand, shells, and mud.

7. As noted in paragraph 14 of the preliminary report, the eastern end of the basin would have to be protected from deterioration by the movement of sand at high tide across the shoal at that point. A bulkhead 600 feet long, extending in an easterly direction from the end of Town Marsh, is shown on the accompanying map. It is planned to construct this bulkhead with one and two man stone to a section having a top width of 3 feet at elevation of 4 feet above mean lower low water, and having side slopes of 1:1. The following is an estimate of the cost of this bulkhead:

5,400 tons of stone, at \$3.....	\$16,200
Superintendence and contingencies.....	1,600
Total cost.....	17,800

The direction indicated on the map for the bulkhead is selected with a view to most economical extension later if found necessary.

8. Referring to paragraph 13, preliminary examination report, it is not now thought advisable to consider providing for this basin any depth greater than 10 feet, and since the Gallants Channel opposite provides 10 feet it seems best to permit the use of the basin by all vessels which may require that depth. The only depth for which estimate is submitted is therefore 10 feet. The width and depth proposed are considered suitable for boats of maximum draft of 9.5 feet, for which the channel is designed.

9. Town Marsh and Bird Shoal are both held in private ownership, and it would be necessary to secure the permission of their owners to deposit material on either place, as well as to construct the proposed bulkhead. No difficulty is anticipated in securing this permission, for it is known that the owner of Town Marsh offered to pay for material deposited thereon when the last dredging was

done by the United States in this vicinity, and three of the men claiming ownership of Bird Shoal stated at the hearing that they were sure there would be no trouble in securing permission to deposit there. The north end of Pivers Island is owned by the United States and occupied by the biological laboratory of the Fish Commission. It is probable that some material could be deposited to mutual advantage there. The ownership of the south end of the island is subject to the right of the United States to deposit there. There has long been some agitation for a sea wall at Beaufort similar to the one at Morehead City, and if any such work is undertaken there will be some demand for filling behind it.

10. In the preliminary examination report, paragraph 15, it was stated that the construction of a suitable public wharf, with storage facilities and mechanical equipment and provided with rail connection to the Norfolk & Southern Railroad, should be a condition precedent to the undertaking of this work by the United States. This condition is believed to be all that should be required in the way of local cooperation, as the town of Beaufort is now holding an election for the purpose of authorizing an issue of bonds to the amount of \$10,000 for its share of the expense of constructing the waterway from Core Sound to Newport River.

11. Having in mind the increase in the commerce in this harbor, nearly \$500,000, and for the reasons given in paragraphs 20 and 21 of the preliminary report, I am of the opinion that the improvement to the extent of providing an anchorage basin, as shown, having a depth of 10 feet, together with the construction of a bulkhead as outlined in paragraph 7 above, at a total estimated cost of \$53,100, is a project worthy of being undertaken by the General Government, subject to the conditions named in paragraph 10 above.

12. If this improvement should be ordered, funds sufficient to cover the entire cost should be provided in the initial appropriation in order that the work may be prosecuted at the rate of 35,000 cubic yards per month. The plan recommended could then be completed in eight months' work.

H. W. STICKLE,
Major, Corps of Engineers.

OFFICE DIVISION ENGINEER, SOUTHEAST DIVISION,
February 18, 1914.

To the CHIEF OF ENGINEERS:

1. After a careful reading of the report on the preliminary examination and of the report on survey within, it does not appear to me that a necessity for the construction of this anchorage sufficient to justify the cost of it has been shown. I therefore report that, in my opinion, the further improvement of "Beaufort Harbor, N. C., with a view to providing a suitable turning basin and anchorage basin in front of the town of Beaufort" is not worthy of being undertaken by the General Government at the present time.

W. C. LANGFITT,
Colonel, Corps of Engineers.

[For report of the Board of Engineers for Rivers and Harbors on survey see page 3.]

AZIMUTHS & DISTANCES

Δ Town Marsh C. & G. S. 1913	to Reids Cr. beacon	99° 00' 13" - 3442 Ft.
	to Hydra base-west	153° 40'
	to Δ Rock	165° 05' 20" - 4106.07'
	to Δ "K"	165° 40' 20" - 2453.5'
	to Court house	209° 21'
	to Δ "J"	239° 57' 30" - 2637.7'
Δ "K"	to Hydra base, west end	4° 22' 00" 1018'
	to Δ River	32° 19' 00" 887'
	to Reids Cr. beacon	56° 25' 00"
	to Δ "J"	303° 47' 00"
Δ River to "K"		212° 19' 00" 887'
	to Hydra base, west	303° 47' 00" 483'
	to Town Marsh	326° 20' 00" 1956'

DESCRIPTIONS

Δ M. is bronze tablet on Δ "K" stamped El. - 5.503 Mean lower L.W.
 Δ "J" is a galvanized iron pipe about 18 in. above sand
 Δ River is galv. iron pipe about 2 ft. above present surface
 Δ Rock, concrete post marked U.S.C.R.S. 1913
 Δ Town marsh
The plane of reference, mean lower low water, is 1.9 feet below mean sea level.

Project recommended by
Board of Engineers
for Rivers and Harbors

PORTION OF
BEAUFORT HARBOR.

HYDROGRAPHY OF JULY AND NOV. 1913.
UNDER DIRECTION OF MAJOR H. W. STICKLE

H. T. PATERSON, ASST. ENG.

SCALE 1:7500

FIELD AND OFFICE WORK BY
A. VON SILLER, JUN. ENG.

U. S. ENGINEER OFFICE, WILMINGTON, N. C.
FORWARDED TO THE CHIEF OF ENGINEERS U. S. ARMY
WITH REPORT OF FEBRUARY 16, 1914

H. W. Stickle
MAJOR CORPS OF ENGINEERS U. S. ARMY

